tion by which rays from points along the arc between these points reach the eye of a terrestrial observer may be considered uniform. Suppose that by the effects of refraction the distance δr, which seen directly from the Earth has that apparent length, is reduced in length, when forming a part of the arc of light round *Venus*, to $\frac{1}{k}\delta r$, k being greater than unity. Then it is obvious that each pencil of rays from points along the luminous strip δr has its divergency in the plane through the strip, *Venus's* centre, and the Earth's, increased, as $k : 1$, in passing along its course (whatever this may be) through the atmosphere of *Venus*. This follows from the uniform variation of the amount of bending for points differently placed along the strip δr. Hence the eye receives fewer rays from each point of the strip δr in the ratio of $1 : k$. Wherefore, neglecting the absorptive effect of *Venus's* atmosphere,

app. brightness of strip δr seen round edge of ♀ : its app. brightness seen directly

$$:: \frac{\text{light recd. round ♀ from each pt. of strip}}{\text{apparent area of strip as seen round ♀}} : \frac{\text{light recd. from each pt. of strip directly}}{\text{apparent area of strip seen directly}}$$

$$:: \frac{1}{k} \div \frac{1}{k}\delta r : \frac{1}{\delta r}$$

$$:: 1 : 1,$$

or the brightness is unchanged.

I may take this opportunity of noting that, in a paper on the Nebulæ recently read before the Royal Society, it is asserted that an irresolvable stellar nebula would diminish in apparent brightness (so far as the stellar part of its light is concerned) with increase of distance. No reasoning is given in support of this assertion; and I can see no reason for withdrawing the reasoning by which, in a paper on the Resolvability of Nebulæ regarded as a Test of Distance, I show (incidentally) that a nebula so long as it remained irresolvable would be of constant intrinsic brightness whatever its distance* (always supposing there is no extinction of light in traversing space).

Margate, June 2, 1877.

Absorption of the Light of Venus by Dark Violet Glass Plates.

By Prof. Zenger.

In October 1876 I observed Venus, to detect spots on it, and so look out for the alleged phosphorescent light of the dark part of the disk. I could observe *Venus* early in the morning during nearly the whole of October; it was then very brilliant, casting a shadow, and by its light making it possible to read the maps on the illuminated wall of the observatory. I could even see

* I have since heard that Prof. Stokes, after the paper had been read before the Royal Society, indicated the error into which its writer had fallen in this respect.

the planet with the naked eye at $21^h 30^m$ and $21^h 40^m$ October 11 and 12, the atmosphere being very calm and pure. On September 30, $20^h 12^m$, and the following day, October 1, $17^h 15^m$, the disk was admirably defined in the telescope, and there was observed a very brilliant patch near the southern horn some two seconds or less from the terminator in the dark parts of the disk, and this was still visible for two days, when the terminator had passed it, shining like a brilliant star in the surrounding part of the illuminated disk.

This observation induced me to try a new method of photometric measurement by dark violet glass plates, putting one or two between the eye-piece and the eye, and determining the distance at which the light of a lamp vanished by one and then by two plates. I found the proportional intensity to be nearly 1 : 5·6 for one to two. Viewing the planet, it was very striking to observe the great diminution of light on the illuminated disk, as the borders vanished entirely by putting two plates before the eye. I lost sight of nearly one-third of the illuminated part, and the middle of it was with only one plate reduced to nearly one-third of its brilliancy. I therefore concluded that, putting the intensity of the most brilliant part of the planet = 1, and dividing the nearly one-half illuminated part in three parts, the intensities of each were nearly as

$$1 : 1 \div 3 : 1 \div 5{\cdot}6, \text{ that is as } 5{\cdot}6 : 1{\cdot}9 : 1.$$

It is obvious that, using a bi-prism with parallel planes, as for solar eye-pieces, and making one of the prisms of dark violet glass, the other being colourless crown glass, there will be a possibility of applying a scale of intensity by the difference of depth of the violet glass, and of measuring with more accuracy the intensity of such brilliant objects as *Venus*, *Jupiter*, the Moon, &c. It seemed to me to be of interest to communicate these observations, as they confirm the results by a quite different method published in one of the last Numbers of the *Monthly Notices*, and giving a new instance of very highly reflecting points on the surface of *Venus* (perhaps snow-covered high peaks) being visible, like on the Moon, before the solar light reaches the lower parts of the surrounding surface. I could never perceive any trace of the so-termed specular reflection, though I think it would have been perceived if there had been in the middle of the planetary disk such a higher intensity of reflected light in a round or elliptical shape.

The diminution of light in the same longitude from the terminator seemed equal all over the disk of the planet, and not changed under different latitudes, as it should be in case of specular reflection.

P.S.—Though I could detect a faint grayish light, sometimes ruddy near the terminator, during the time from September 30 to October 14, the atmosphere being uncommonly transparent, yet I could never see the whole of the dark part of *Venus*,

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though the planet afforded, from 16^h to 18^h in the morning of three days of October, a most splendid view. On the contrary, it seemed with daybreak to be more easy to see the faint illumination near the terminator, even to two-thirds of the whole breadth of the dark part of *Venus*.

Prague, February 17, 1877.

Measures of α Centauri, 1870 to 1877.

By H. C. Russell, Esq., Director of the Sydney Observatory.

As the double star *α Centauri* did not arrive at periastron in 1875 as predicted, perhaps the following measures of this interesting double, taken during the ordinary course of my observations on southern double stars, during the past seven years, may not be without interest. It is evident from these observations that α^2 will not make its nearest approach to α^1 until about the end of this year. Its predicted arrival at that point was therefore nearly three years in error. It is my intention to observe it closely during the next few months; and I hope to obtain such a series of measures as may serve to determine its periastron with accuracy. Some correction may be necessary to my position-angles, on account of *personal bias*, for I find that I do not measure the angle the same when the telescope is east as I do when it is west of the pier (see observations of July 20 and July 24, 1877), but I have not time to investigate the amount before this mail closes.

The observations from 1870 to 1874 were made with a $7\frac{1}{4}$-in. refractor by Merz, of 10 ft. 4 in. focus, and very fine defining power. The remainder have been made with an $11\frac{1}{2}$-in. refractor by Schroeder, a very fine instrument. The method of observing is to place the position-wire bisecting both stars, and then make the distance wires bisect them. After reading, the position-wire is turned right away, and brought back again, and the distance wires crossed; each observation, therefore, which follows is an independent determination of the distance and position-angle. The only exception is the series September 27, 1870, when the position-circle was not moved after it was set the first time.

All the observations, except those in 1870, were taken when the star was near the meridian.

Results of Measures of Double Star α Centauri, at the Sydney Observatory.

Date.	Position-Angle.		Distance.	Remarks.
1870	°	′	″	
Sept. 27	21	58	10·0	Definition good; stars have sharp round disks; telescope $7\frac{1}{4}$ inches; P. 230; aperture 3 inches.
	21	58	11·0	
	21	58	10·7	
	21	58	10·7	
	21	58	9·6	
Means	21	58	10·40	